

SECRET

MONTHLY REPORT

CONTRACT

25X1

PAR 217

7 August 1964

SUBJECT: Optimization of the Lasers

TASK/PROBLEM

1. Explore the production of 0.53 micron (blue-green) laser radiation by harmonic doubling in KDP & ADP crystals.

DISCUSSION

2. During this period, the 0.53 micron second harmonic output from one of our KDP crystals was measured. Measurements were made of both the absolute output and the percent conversion of the incident 1.06 micron energy. The electrical input energy range for these measurements was 1500 to 7000 joules resulting in a laser efficiency of approximately two percent.

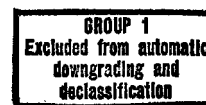
3. At 36 joules of 1.06 micron energy, a conversion efficiency (0.53 micron radiation) of $3 \times 10^{-4}\%$ was obtained, and this increased to $10^{-3}\%$ at a crystal input of 120 joules. Although these efficiencies were low, they showed excellent agreement with the theoretical linear relationship between conversion efficiency and input energy.

4. In searching for causes of the low efficiency, it was found that the KDP crystals were not optimally orientated. As a result, 3 additional crystals have been ordered.

PLANNED ACTIVITY

5. The new crystals should be delivered during the next period, at which time their characteristics will be evaluated.

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Declass Review by NIMA/DOD